

APPENDIX A

POLICIES, PROGRAMS, AND REGULATIONS

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A.1 STATUTES AND REGULATIONS

A.1.1 CLEAN AIR ACT (CAA)

The Clean Air Act (42 USC 7401 *et seq.*) was first enacted in 1970 to regulate airborne emissions of a variety of pollutants from area, stationary, and mobile sources. The 1990 CAA Amendments were intended primarily to fill the gaps in the earlier regulations, such as acid rain, ground level ozone, stratospheric ozone depletion, and air toxics. The 1990 Clean Air Act Amendments Section 112(b) identifies a list of 189 hazardous air pollutants (HAP) selected by Congress based upon their potential for causing human health or environmental hazards. The U.S. EPA must study these chemicals, identify their sources, determine if emissions standards are warranted, and promulgate appropriate regulations (40 CFR Parts 61 and 63). The list of HAPs includes PCBs; dioxins and furans; chlordane; mercury compounds; DDE; lead compounds (but not elemental lead); cadmium compounds; chromium compounds; arsenic compounds; cyanide compounds; hexachlorobenzene; toxaphene; DEHP; 1,2,4-trichlorobenzene; and selenium compounds.

EPA has developed an action plan for the National Air Toxics Program which is divided into 4 components:

- Source and sector-specific standards;
- Multi-media projects and risk initiatives;
- National air toxics assessments; and
- Education and outreach.

Source and sector specific standards include national technology-based standards, combustion standards, residual risk standards, area source standards, seven specific pollutants designated for special attention, utility determination and regulation, and mobile source standards.

- National Technology-Based Standards: Under the CAA amendments of 1990, EPA is required to develop standards for each of the 174 stationary sources that emit one or more of the 188 identified hazardous air pollutants. These standards, known as Maximum Achievable Control Technology (MACT) standards, are based on the emissions levels that are already being achieved by the better controlled sources in an industry. To date, EPA has promulgated 44 emission standards covering 79 source categories. These standards are responsible for annual reductions of approximately 1.5 million tons of air toxics and 2.5 million tons of VOCs. Over the next 3 years, EPA plans to promulgate additional emission standards, which should achieve annual reductions of another ½ million tons.
- Combustion Standards: Under Section 129 of the CAA, EPA has issued 2 final rules to control emissions of certain toxic pollutants from certain types of solid waste combustion facilities. These rules set emission limits for new solid waste combustion facilities and provide emissions guidelines for existing solid waste combustion facilities. These rules affect municipal waste combustors and hospital/medical/infectious waste incinerators, which account for 30 percent of the national mercury emissions to the air. By the time these rules are fully implemented, they are expected to reduce mercury emissions from these sources by about 90 percent from current levels, and reduce dioxin/furan emissions from these sources by more than 95 percent from current levels. EPA is working on additional rules to address industrial and commercial waste incinerators, other solid waste incinerators, and small municipal waste combustor units.

- Residual Risk Standards: The residual risk program is designed to assess the risk remaining from stationary source categories after EPA implements a technology-based standard. EPA is required to set additional standards if the level of “residual risk” does not provide an “ample margin of safety to protect public health” or if further emissions reductions are needed “to prevent, taking into consideration costs, energy, safety, and other relevant factors, an adverse environmental effect.” These residual risk standards are required within 8 years (9 years for the earliest standards) after EPA finalizes the technology-based standard.
- Area Source Standards: Under the Integrated Urban Air Toxics Strategy, EPA must ensure that 90 percent of the area source emissions of the 30 “area source” urban air toxics listed in the Strategy are regulated. In order to accomplish this, EPA identified new source categories of smaller commercial and industrial operations or so-called “area” sources for regulation. EPA plans to finalize regulations for these area source categories by 2004. EPA has completed or nearly completed regulations on an additional 16 area source categories. However, the EPA will be adding source categories to that list for regulation to meet the requirement to regulate 90 percent of the area source emissions.
- Seven Specific Pollutants: The CAA lists seven specific pollutants (alkylated lead compounds, polycyclic organic matter (POM), hexachlorobenzene, mercury, polychlorinated biphenyls, 2,3,7,8-tetrachlorodibenzofurans (TCDF) and 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD)) for special attention by the EPA. EPA must regulate sources accounting for 90 percent of the emissions of these toxics. On April 3, 1998, EPA issued the list of additional source categories. They are (1) open burning of scrap tires (for POM); and (2) gasoline distribution Stage I Aviation, including evaporative losses associated with the distribution and storage of aviation gas containing lead (for lead). EPA plans to complete these standards by 2003.
- Utility Determination and Actions: EPA is continuing to gather data on mercury emissions from coal-fired electric utility power generation plants to evaluate the need for regulation of toxic air pollutants from these sources. Utility plants (primarily coal-fired plants) emit approximately 50 tons per year of mercury nationwide, which is almost 1/3 of the anthropogenic mercury emissions in the U.S. EPA will make a determination on whether to regulate air toxics emissions from electric utilities by December 2000.
- Mobile Source Standards: EPA began enforcing the first federal emission standards for passenger cars in 1968. Since then, EPA has developed emission standards for all types of highway vehicles, their fuels, and engines used in virtually every variety of mobile or portable nonroad vehicle/equipment including tractors, construction vehicles, recreational and commercial vessels, and lawn and garden equipment. EPA has promulgated increasingly stringent emission standards. In May of 1999, EPA proposed more stringent standards for all cars and light duty trucks, as well as the gasoline they use. At the same time, EPA issued an advance notice of proposed rulemaking to solicit information relating to control of diesel fuel quality. EPA is currently reviewing standards for heavy-duty highway vehicles and their engines for 2004, and considering new emission standards for these vehicles and engines beyond 2004. EPA is also reviewing standards for nonroad diesel engines.

In 1990 Congress amended the Clean Air Act to add a requirement that EPA consider motor vehicle air toxics controls. Section 202(l), required EPA to study motor vehicle-related air toxics, and to promulgate requirements for the control of such pollutants based on that study. The study was completed in 1993, and EPA is presently updating the emissions and exposure analyses and working on a rule to regulate motor vehicle toxic air emissions.

Multi-media projects and risk initiatives include the Great Waters Project, the Mercury Total Maximum Daily Load Air Deposition Pilot Project, the Air-Water Interface Action Plan, the Integrated Urban Air Toxics Strategy, urban community-based pilot projects, mercury initiatives, Mercury Research Strategy, and coordination initiatives.

- Great Waters: The CAA directs EPA to monitor, assess, and report on the deposition of toxic air pollutants to the “Great Waters,” which include the Great Lakes, Lake Champlain, Chesapeake Bay, and other coastal estuaries. Activities include assessing deposition to these waters by establishing a deposition monitoring network, investigating sources of pollution, improving monitoring methods, evaluating adverse effects, and sampling for the pollutants in aquatic plants and wildlife. Pollutants of concern to the Great Waters include mercury, lead, cadmium, nitrogen compounds, POM/PAHs, dioxins and furans, PCBs, and seven banned or restricted pesticides.
- Mercury Total Maximum Daily Load (TMDL) Air Deposition Pilot Project: The Great Waters program is multimedia in nature and requires cross-program approaches to investigate and address problems. EPA’s air and water programs are working together on two studies to address mercury deposition to waterways. The outcome of this effort will influence the development of joint national guidance for addressing Total Maximum Daily Loads (TMDLs) where air deposition is a factor. The study is being conducted on Devil’s Lake in Wisconsin and the Florida Everglades. For each of the waterbodies, the project will evaluate techniques for determining the amount of mercury reductions needed to meet water quality standards, and techniques for determining the relative contributions of mercury from various sources, source categories, and source regions. The project will also analyze federal and state regulatory and non-regulatory tools for reducing mercury emissions that may be causing water quality problems. Pilot TMDLs will be developed for each of the study areas. In addition, EPA plans to issue a report on lessons learned from both pilot projects in the summer of 2000.
- Air-Water Interface Action Plan: The action plan is intended to consolidate EPA's efforts to understand and address atmospheric deposition nationwide, including the Great Waters and other state-identified impaired waterbodies. The plan will: target state-identified impaired waterbodies; examine the rules or activities currently in place to address impairment caused by air deposition; and determine what, if any, additional actions are necessary to address impairment caused by air deposition. To date, OAR and OW management have held two meetings with Great Lakes environmental groups to discuss various components of the action plan including TMDLs, upcoming MACT standards, and air toxics monitoring. A draft plan will be developed for external review shortly.
- Integrated Urban Air Toxics Strategy: The urban strategy includes the same components of the overall air toxics strategy, but it has risk-based goals for addressing air toxics in urban areas. Specifically, the strategy has three goals for urban areas: (1) ensure a 75 percent reduction in cancer incidence from stationary sources; (2) ensure a “substantial” reduction in health risks from area sources; and (3) ensure that disproportionate risks are addressed first, thus focusing efforts on sensitive populations or geographic hot spots.
- Urban community-based pilot projects: Since exposure to air toxics vary (in terms of pollutants and sources) between urban areas across the country, EPA’s activities to reduce risk on a national scale may not address potential local risks. Consequently, the strategy includes local and community-based initiatives which will involve partnerships between EPA and the state, local, and tribal governments.

- Mercury Initiatives: The CAA requires EPA to issue a report on the sources and impacts of mercury. EPA released the *Mercury Report to Congress* in December 1997. The report includes an assessment of the emissions of mercury from all known anthropogenic sources in the United States, the health and environmental implications of these emissions, and the availability and cost of controlling these emissions. The report supports a plausible link between anthropogenic releases of mercury from industrial and combustion sources in the United States and methylmercury in fish.
- Mercury Research Strategy: EPA's Office of Research and Development's (ORD) *Mercury Research Strategy* seeks to address the scientific questions of greatest concern regarding mercury through a coordinated research program. There are two key fate and transport questions the strategy seeks to address: (1) the quantity of methylmercury in fish contributed by U.S. sources relative to other natural and global sources; and (2) the amount and length of time which levels of methylmercury in fish in the U.S. will decrease as the result of reductions made by U.S. sources.
- Coordination initiatives: EPA has a number of activities to identify and address risks from specific types of pollutants. The Persistent Bioaccumulative Toxics (PBT) Initiative seeks to further reduce risks to human health and the environment from existing and future exposure to persistent, bioaccumulative, and toxic pollutants through a coordinated effort between EPA offices, and other federal, state and local agencies. The CWAion Plan (CWAP) seeks to address the remaining obstacles to the CWA's original goal of "fishable and swimmable" water for all Americans. The CWAP identifies non-point sources, including atmospheric deposition, as the most important remaining threat to water quality.

National Air Toxics Assessment Activities (NATA) activities are a primary component of EPA's national air toxics program. These activities help set program priorities, characterize risks, and track progress toward meeting the goals of the national air toxics program, as well as specific risk-based goals. More specifically, NATA activities include: expanding air toxics monitoring; improving and updating emissions inventories; conducting national- and local-scale air quality, multi-media, and exposure modeling; characterizing risks associated with air toxics exposures; and continued research on health and environmental effects and exposures to both ambient and indoor sources of air toxics. EPA is now conducting an initial screening-level assessment to demonstrate an approach to characterizing air toxics risks nationwide. Other planned assessments include pollutant-specific activities such as the Dioxin Reassessment and Action Plan and a proposed National Air Deposition Assessment.

Education and Outreach: EPA believes that public participation is vital for the implementation of the overall air toxics program. EPA is committed to working with cities, communities, state, local and tribal agencies, and other groups and organizations that can help implement activities to reduce air toxics emissions. Outreach and education efforts include:

- Great Waters Program Outreach: The CAA directs EPA to periodically report its findings of monitoring, studies, and investigations conducted under this program. The EPA has already submitted a *First* and *Second Report to Congress* and is in the process of completing the *Third Great Waters Report to Congress*. EPA is also working on additional outreach tools for the public, such as an educational brochure to inform the public about air deposition issues and further enhancements to Great Waters websites. During 2000, EPA will be developing a handbook to assist water resource managers in characterizing air deposition problems.
- Urban Air Toxics Report to Congress: EPA is required under the CAA to provide two reports to Congress on actions taken to reduce the risks to public health posed by the release of toxic air

pollutants from area sources. The CAA also requires that the reports identify specific metropolitan areas that continue to experience high risks to public health as a result of emissions from area sources. EPA will complete the first of these two reports in late 1999. The second report is due in 2004.

A.1.2 CLEAN WATER ACT (CWA)

The 1977 amendments to the Federal Water Pollution Control Act, called the CWA (33 USC 1251 *et seq*) regulates discharges to navigable (surface) waters with the goal of restoring and maintaining the chemical, physical, and biological integrity of the nation's waters. Toxic substances were the focus of the 1977 amendments. The CWA authorized EPA to set technology-based effluent standards on an industry basis and continued the obligation to set water quality standards for all surface water contaminants. In addition, EPA may set water quality-based effluent limitations in situations where discharges would otherwise interfere with the attainment and maintenance of water quality sufficient to ensure the protection of public health, public water supplies, and agricultural and industrial uses, as well as the protection and propagation of a balanced population of shellfish, fish, and wildlife.

The CWA prohibits any person from discharging a pollutant from a point source into navigable waters without a National Pollutant Discharge Elimination System (NPDES) permit (33 U.S.C. 1342, 40 CFR 122). Individual facilities are subject to effluent limits and/or monitoring requirements in their NPDES permit. Effluent limitations for discharges are based on the use of Best Available Technology that is economically achievable (BAT) for specific point sources. Pretreatment requirements are established for indirect discharges which are discharged from industries via municipal wastewater treatment plants or sewage treatment plants (33 USC 1314(g), 40 CFR Part 403). A list of 65 toxic pollutants subject to pretreatment requirements can be found at 40 CFR Part 403 Appendix B. This includes categorical standards developed by EPA for each industry, as well as local standards developed by each publicly owned treatment plant (POTW) (40 CFR Part 403 Appendix C).

NPDES permits regulate household and industrial wastes that are collected in sewers and treated at municipal wastewater treatment plants. The permits also regulate industrial point sources and concentrated animal feeding operations that discharge directly into receiving waters. Effluent limits for both direct and indirect discharges are generally sector specific (e.g., for a particular segment of an industry).

Many storm water discharges also require an NPDES permit. These include discharges associated with industrial activities or from large or medium municipal storm sewer systems. In addition, NPDES permits are required for all discharges determined by EPA or the state to contribute to a violation of a water quality standard or to be a significant contributor of pollutants to the waters of the United States.

The CWA identifies approximately 125 pollutants on a Priority Pollutant List. This list includes aldrin, chlordane, mercury, lead, cadmium, copper, zinc, chromium, arsenic, hexachlorobenzene, toxaphene, 1,2,4-Trichlorobenzene and DEHP. EPA has developed water quality criteria for all of the priority pollutants. In addition, the CWA has designated certain substances to be "hazardous substances," including PCBs.

Section 118(c) of the CWA is entitled "Great Lakes Management" and contains provisions for water quality in the Great Lakes. Section 118(c)(2) requires EPA to "specify numerical limits on pollutants in ambient Great Lakes waters to protect human health, aquatic life and wildlife". It also states that EPA shall "provide guidance to the Great Lakes States on minimum water quality standards, antidegradation policies, and implementation procedures for the Great Lakes System."

On October 4, 1999, EPA issued a proposed rule to prohibit mixing zones for bioaccumulative chemicals of concern in the Great Lakes (64 FR 53632). This proposed rule is similar to that proposed on March 23, 1995, as part of the Great Lakes Water Quality Guidance (required under CWA Section 118(c)(2)). A mixing zone is an area beyond the outfall of a point source discharge where ambient water quality may exceed otherwise applicable concentrations of a given pollutant. In effect, the receiving water dilutes the effluent before it reaches the boundary of the mixing zone. A bioaccumulative chemical of concern is defined as “any chemical that (1) accumulates in aquatic organisms by a human health bioaccumulation factor greater than 1,000 (after considering various specified factors), and (2) has the potential upon entering the surface waters to cause adverse effects, either by itself or in the form of its toxic transformation product, as a result of that accumulation” (40 CFR 132.2).

Section 304(a)(1) requires EPA to develop (and to periodically revise as necessary) aquatic life criteria to provide guidance in setting water quality standards. These criteria developed pursuant to Section 304(a) do not take into consideration any economic impacts or technological feasibility; only data and scientific judgment are used to develop the criteria. On October 29, 1999, EPA issued a Notice of Intent to revise aquatic life criteria for several chemical substances and to develop aquatic life criteria for several additional chemical substances.

A.1.3 COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT (CERCLA)

The Comprehensive Environmental Response, Compensation, and Liability Act (42 USC 9601 *et seq*), commonly referred to as Superfund, was enacted in 1980 following the discovery of the Love Canal hazardous waste site and the attempts to recover cleanup costs from liable parties, bringing to the forefront the issue of hazardous chemicals and the related disposal sites. It creates a federal Superfund to clean up uncontrolled or abandoned hazardous waste sites as well as accidents, spills and other emergency releases of pollutants. In EPA Region 5, CERCLA is administered by the Superfund Division.

Section 102(a) of CERCLA contains an extensive list of hazardous substances that are subject to release reporting regulations. (The list and the corresponding reporting quantities can be found at 40 CFR 302.4. In addition, certain unlisted substances may be subject to reporting regulations. Any substance which is a solid waste, as defined at 40 CFR 261.2, and not excluded from regulation as hazardous wastes by 40 CFR 261.4(b) is a hazardous substance under Section 101(14) of CERCLA if it exhibits any of the characteristics found at 40 CFR 261.20-261.24. All unlisted hazardous substances have reporting quantities of 100 lbs unless they exhibit extraction procedure (EP) toxicity identified in 40 CFR 261.24. These reporting quantities apply to the entire quantity of waste, not just the toxic contaminant (See 40 CFR 302.5(b)).

The National Response Center (NRC) must be notified immediately by the person in charge of a vessel or facility when there is a release to any environmental media of a designated hazardous substance exceeding the predefined reportable quantity within any 24 hour period. The reporting quantities are determined on the basis of aquatic toxicity, acute mammalian toxicity, ignitability, reactivity, chronic toxicity, and carcinogenicity, with possible adjustments based upon biodegradation, hydrolysis, and photolysis. The National Contingency Plan (which was originally developed in 1968 to respond to offshore oil spills following the Torrey Canyon tanker accident in the English Channel) was revised to provide guidelines and procedures needed to respond to releases or threatened releases of hazardous substances, pollutants, or contaminants.

A.1.4 FEDERAL INSECTICIDE, FUNGICIDE, AND RODENTICIDE ACT (FIFRA)

The Federal Insecticide, Fungicide, and Rodenticide Act (7 USC 136 *et seq*) was originally passed by Congress in 1947 as a consumer protection statute focused on the registration and labeling of pesticides. FIFRA now also regulates the sale, distribution, use, and cancellation of pesticides within the United States. Under FIFRA, EPA has the authority to study the consequences of pesticide use and to require users to register when purchasing pesticides.

In 1988, Congress amended FIFRA to strengthen and accelerate EPA's re-registration program, commonly called "FIFRA 88." The re-registration requirements apply to all registered pesticide products containing an active ingredient initially registered before November 1, 1984. List A consists of 194 chemical cases (350 individual active ingredients) subject to the amendments. Any pesticide that is no longer an active ingredient in any registered pesticide is considered by EPA to be "canceled." LaMP chemicals considered to be canceled include dieldrin, aldrin, DDT (with limited exceptions), HCB, toxaphene, chlordane, and DDD.

Pesticide producers may voluntarily cancel their pesticide registrations. In addition, EPA may cancel the registration of a pesticide based on several criteria, including the following: (1) the registrant failed to pay the required fees; (2) the registrant failed to make or meet certain re-registration commitments; or (3) EPA determines that the pesticide causes an unreasonable adverse effect on the environment. The United States currently has no legislative authority to prohibit the production or export of a canceled pesticide, but such products are subject to export notification requirements under FIFRA. The Great Lakes states all have cooperative agreements with EPA to implement FIFRA within the states.

A.1.5 OCCUPATIONAL SAFETY AND HEALTH ACT (OSHA)

The Occupational Safety and Health Act (29 USC 651 *et seq*) was enacted in 1970 to ensure the safety of workers and the workplace. In addition, it created the National Institute for Occupational Safety and Health (NIOSH) to establish standards for workplace safety and health as a research arm of the Occupational Safety and Health Administration. OSHA is a division of the Department of Labor and administers and enforces workplace standards in all states.

A.1.6 RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)

The Resource Conservation and Recovery Act (42 USC 6901 *et seq*), which was enacted in 1976, establishes a regulatory structure, called "cradle to grave," for the handling, storage, treatment, and disposal of solid and hazardous wastes. The hazardous waste management program established under Subtitle C regulates hazardous wastes from the point of generation up to and including disposal, focusing on active and future facilities. Many products and materials are regulated under RCRA, including commercial chemical products; manufactured chemical intermediates; off-specification commercial chemical products or manufactured chemical intermediates; residue, contaminated soil, water, or other debris resulting from the cleanup of a spill into water or on dry land; and the containers and inner liners of the containers used to hold waste or residue.

Under RCRA, wastes are classified as hazardous if they are included on any of the RCRA lists (F, K, P, or U) or if they exhibit any of the following characteristics: ignitability, corrosivity, reactivity, or toxicity. The lists may be found at 40 CFR 261.30-33. Chemicals on the P list are identified as acute hazardous wastes, and those on the U list are designated toxic wastes. All listed chemicals must be managed in accordance with federal and state hazardous waste regulations.

In 1984, the Federal Hazardous and Solid Waste Amendments (HSWA) required the phasing out of land disposal for hazardous wastes. The corrective action program mandated by the HSWA enables the regulatory agencies to also require remediation of legacy problems at RCRA treatment, storage and disposal facilities.

A.1.7 SAFE DRINKING WATER ACT (SDWA)

The Safe Drinking Water Act of 1974 (42 USC 300f *et seq*) was passed to protect human health from contaminated sources of drinking water and to prevent contamination of existing clean water supplies. Pursuant to the SDWA, EPA determined safe levels of chemicals occurring in drinking water that do or may cause health problems. These enforceable levels are called Maximum Contaminant Levels (MCL) and represent the maximum permissible level of a contaminant in public drinking water systems. MCLs are based on health factors, but are required to reflect technological and economic feasibility of removing the contaminant from the water system. All owners and operators of public water systems must meet these health-related standards. In addition, EPA has established unenforceable MCL goals (MCLG).

EPA may delegate implementation of the SDWA requirements to the states. While EPA enforces primary (health-related) standards, the states generally encourage public water systems to meet secondary (nuisance-related) standards.

A.1.8 SUPERFUND AMENDMENT AND REAUTHORIZATION ACT (SARA)/ EMERGENCY PLANNING AND COMMUNITY RIGHT-TO-KNOW ACT (EPCRA)

The Superfund Amendments and Reauthorization Act of 1986 (42 USC 9601 *et seq*) was intended to clarify and strengthen CERCLA. SARA required that all Superfund remedial actions take into consideration state and federal standards and regulations. It provided increased focus on human health problems associated with or posed by hazardous waste sites and encouraged greater state and private citizen participation. In addition, SARA revised the Hazard Ranking System to ensure that it accurately assessed the relative degree of risk to human health and the environment posed by the uncontrolled hazardous waste sites that may be placed on the National Priority List.

Title III of SARA (42 USC 11001 *et seq*) was enacted to help local communities protect public health, safety, and the environment from chemical hazards. It requires that releases of specified chemicals to the air, water, or land be reported to the Toxic Release Inventory (TRI). These requirements apply to specified manufacturing facilities (SIC codes 20-39, plus other specific facilities) that have 10 or more full-time employees and manufacture or process 25,000 pounds of a listed chemical or otherwise use 10,000 pounds of a listed chemical. Each listed chemical has established reporting thresholds, requiring that releases over a certain quantity to be reported; these reporting quantities are found at 40 CFR Part 372. On October 29, 1999, EPA issued a final rule lowering the reporting thresholds for 18 persistent bioaccumulative toxic substances and adding dioxin and dioxin-like compounds to the list with a mandated reporting threshold (64 FR 58665). EPA compiles and provides public access to the annual emissions data.

In order to implement these regulations, each state is required to appoint a State Emergency Response Commission, which is required to divide the state into Emergency Planning Districts. Each Emergency Planning District is to have a Local Emergency Planning Committee.

Emergency planning is required when substances designated as “Extremely Hazardous Substances” (EHS) are present in quantities exceeding Threshold Planning Quantities (TPQ). TPQs are determined by a combination of acute toxicity characteristics and the ability of the substance to become airborne. Facilities with listed EHSs in quantities greater than the TPQ must report to the State Emergency

Response Commission (EPCRA Section 302, 40 CFR Part 355). The list of EHSs and their corresponding TPQs is found at 40 CFR Part 355, Appendix A.

A.1.9 TOXIC SUBSTANCES CONTROL ACT (TSCA)

The Toxic Substances Control Act (15 USC 2601 *et seq.*) was enacted in 1976 to give EPA the authority to track chemicals produced in or imported into the United States. EPA tracks the thousands of new chemicals developed each year and repeatedly screens all chemicals. EPA can (1) require reporting or testing of chemicals that may pose environmental risks or human health hazards and (2) ban the manufacture or importation of any chemicals that may pose unreasonable risks. TSCA supplements the Clean Air Act and TRI under EPCRA.

In addition, TSCA regulations in the U.S. (40 CFR Part 761) dictate restrictions on the manufacture, sale, use, disposal, import and export of PCBs. TSCA also includes provisions for allowable uses of PCBs.

Additional information can be found at <http://www.great.lakes.net/law/lawpolicy.html>.

A.2 PROGRAMS

A.2.1 BINATIONAL TOXICS STRATEGY

The Binational Toxics Strategy (BNS) challenges the United States to reduce releases to the Great Lakes of identified chemical sources resulting from human activities by 2006. It establishes processes for involving stakeholders and chemical-specific workgroups. An additional challenge of the BNS is assessing atmospheric inputs of the identified substances and, if long range sources are confirmed, working within international frameworks to reduce such releases.

A.2.2 CONTAMINATED SEDIMENT MANAGEMENT STRATEGY (EPA)

The Contaminated Sediment Management Strategy promotes the consideration and reduction of ecological and human health risks posed by sediment contamination through cross-program coordination and a watershed approach. The goal is to remediate contaminated sediments and to prevent future contamination. Methods of remediation and prevention include source control and pollution prevention.

A.2.3 CONVENTION ON LONG-RANGE TRANSBOUNDARY AIR POLLUTION (United Nations Economic Commission for Europe)

The Long Range Transboundary Air Pollution (LRTAP) Protocol of 1998 establishes a framework for controlling, reducing, and eliminating discharges, emissions, and losses of persistent organic pollutants worldwide.

A.2.4 GREAT WATERS PROGRAM

Section 112(m) of the 1990 CAA Amendments establishes research, reporting, and potential regulatory requirements related to atmospheric deposition of HAPs to the "Great Waters" of the United States (including the Great Lakes). This program is intended to coordinate the various activities implementing these requirements.

A.2.5 INTEGRATED ATMOSPHERIC DEPOSITION NETWORK

The Integrated Atmospheric Deposition Network (IADN) is a joint U.S.-Canada monitoring network established to address issues concerning airborne contaminants in the Great Lakes basin. It monitors specific airborne pollutants to assess the magnitude and trends of atmospheric deposition of those substances to the Great Lakes. In addition, sources of those pollutants are to be identified where possible.

A.2.6 INTEGRATED URBAN AIR TOXICS STRATEGY (EPA)

The Integrated Urban Air Toxics Strategy identifies 33 airborne toxics that present the greatest threat to human health in the greatest number of urban areas. Key components of the strategy are (1) regulations to address sources at both national and local levels; (2) initiatives to identify and address specific community risks; (3) air toxics assessments to identify areas of concern, prioritize efforts to reduce risks, and track progress; and (4) public education and outreach efforts that also seek input for program design and implementation.

Episodic Events - Great Lakes Experiment (EEGLE)

The purpose of the Episodic Events - Great Lakes Experiment is to create an integrated observational program and numerical modeling effort to identify, quantify, and develop prediction tools for the winter-spring resuspension event and to assess the impact of this event on the transport and transformation of BIMS and on lake ecology. Three fundamental hypotheses focus this program:

1. that the plume is a result of the first winter-spring storm after ice-out and represents the resuspension of particulate materials (and associated constituents) that have been stored in the lake as surface sediment "floc" for a distribution of times, during which they have undergone differential diagenesis,
2. that the forced, two-gyre vorticity wave response of the lake to episodic wind events, occasionally modified by stratification, is a major mechanism for nearshore-offshore transport of particulate matter and associated constituents in the Great Lakes, and
3. that physical processes (e.g., resuspension, turbulence) associated with the plume event are important in determining the nutrient and light climate, and in structuring the biological communities throughout the spring isothermal period, and in setting the conditions for the critical 'spring bloom' period.

Recent satellite observations of suspended sedimentary material in Lake Michigan illustrate a unique opportunity to investigate an annually recurrent major episode of nearshore-offshore transport: 10 km wide plume of resuspended material extending over 200 km along the southern shores of the lake. The plume appears to be initiated by a major late winter storm after the melting of surface ice, and it eventually veers offshore along the eastern shore of the lake, coincident with the area of highest measured sediment accumulation in the lake. The inventory of particulate matter in the plume, dated April 2, 1996, is approximately equal to the total annual load of fine sediments into the southern basin. Preliminary evidence indicates that this episodic event may be the major mechanism for cross-margin sediment transport in Lake Michigan. This type of event is ideal for studying internal recycling of biochemically important materials (BIMS), ecosystem responses, and one of the major processes controlling cross-isobath transport in the Great Lakes.

The episodic resuspension and subsequent transport of surface sediments profoundly influences biogeochemical processes in coastal ecosystems. Resuspension and transport of the large inventories of nutrients and contaminants deposited over the past few decades (e.g., P, Cs¹³⁷, PCBs), presently results in much greater fluxes to the water column than from all external inputs. In addition, control of biological processes can occur as a result of effects on light and substrate availability and the introduction of meroplanktonic species. The magnitude and episodic nature of these processes in the Great Lakes has been poorly described from a few point measurements or as the residual term in mass balance models. This multi-disciplinary project will employ a comprehensive measurement and modeling approach to examine and compare effects of episodic physical forcing in relation to more persistent long-term (ie., seasonal meteorological) forcing on nutrient inventories, fluxes, and distributions, and on biological distributions and rate processes.

A.2.7 LAKEWIDE MANAGEMENT PLANS

Annex 2 of the 1987 Amendments to the Great Lakes Water Quality Agreement committed the United States and Canada to developing Lakewide Management Plans (LaMP) for each of the five Great Lakes. Each LaMP is intended to assess critical pollutants as they relate to the impairment of beneficial uses and to develop methods for restoring those impaired uses. The requirement for LaMPs has been codified at Section 118(c)(4) of the CWA.

A.2.8 LEVEL 1 PESTICIDES ACTION PLAN

EPA is currently developing a Level 1 Pesticides Action Plan (pursuant to the BNS). This Plan will address aldrin/dieldrin, chlordane, DDT, and toxaphene, among other pesticides.

A.2.9 MULTIMEDIA STRATEGY FOR PRIORITY PERSISTENT, BIOACCUMULATIVE, AND TOXIC POLLUTANTS (EPA)

The Priority Persistent, Bioaccumulative, and Toxic (PBT) Pollutant Strategy (a draft of which was released in November 1998) builds upon the Binational Toxics Strategy, seeking reductions from such substances at a national level. Additional substances may also be added. The goal is to address cross-media issues associated with PBT pollutants, going beyond the single statute approach, to further reduce risks to human health and the environment from existing and future exposure to priority PBT pollutants. EPA will coordinate the use of its statutory authorities and resources to maximize public health and environmental protection. In addition, EPA will promote stronger multimedia coordination among national and regional EPA programs.

A.2.10 PESTICIDE CLEAN SWEEPS

Pesticide Clean Sweeps are state programs that provide a means of collecting and disposing of waste agricultural pesticides. Unused stocks of many canceled pesticides have been collected in these Clean Sweeps.

A.2.11 REMEDIAL ACTION PLANS

The 1987 Amendments to the Great Lakes Water Quality Agreement contained provisions for Remedial Actions Plans (RAP) to restore beneficial uses to 43 specified Areas of Concern throughout the Great Lakes. These RAPs are designed to incorporate an ecosystem approach to addressing critical pollutants and restoring beneficial uses. The mandate and requirements for developing RAPs are codified at Section 118(c)(3) of the CWA.

A.2.12 BEACH MONITORING

EPA has a web site for up-to-date information about water quality and beach closings at more than 1,000 beaches nationwide, including Chicago, Milwaukee, southwest Michigan, and Indiana Dunes. The information is available at <http://www.epa.gov/ost/beaches> (EPA 1998(h)). In 1995, 28 of the more than 200 Lake Michigan beaches being monitored were temporarily closed because of poor water quality. Indiana tests waters near beaches on a weekly basis using an EPA-recommended standard for *E. coli* (MDNR 1998a).

A.2.13 HEALTHY BEACHES INITIATIVE

The Healthy Beaches Initiative is a collaborative effort among several agencies seeking to protect the health of the Indiana shoreline of Lake Michigan. This organization is especially concerned about sporadic, unpredictable, high levels of bacteria in the nearshore waters in northern Indiana (MDNR 1998a).

A.2.14 E. COLI INTERAGENCY TASK FORCE

In response to bacterial contamination of Indiana beaches in 1996, 18 local, state, and federal agencies formed the *E.coli* Interagency Task Force to share information and address bacterial contamination along Lake Michigan. The Illinois-Indiana Sea Grant Program invested about \$80,000 in research to differentiate human waste from animal waste by assessing the presence of a virus and bacteria in the waste. Being able to differentiate the wastes will indicate the source of pollution. This group is also looking at bifidobacteria and poliovirus, both indicators of human fecal pollution. Poliovirus is associated with waste from newly immunized humans (Ting and others 1996).

A.2.15 AQUATIC NUISANCES

A.2.15.1 Current Programs and Information Gathering Efforts

The control of aquatic nuisance species (ANS) has global implications and requires policies and programs at various levels of government. This section provides a brief overview of the role of major programs and responsible agencies addressing ANS. For a more detailed explanation of the responsibilities of each agency, see the *Briefing Paper for Great Lakes Nonindigenous Invasive Species Workshop*.

- **Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 (NANPCA)**

The NANPCA provides U.S. federal legislative support for programs aimed at ANS prevention and control. The Act was drafted by Congress in recognition of the fact that the ANS threat required well coordinated research, monitoring, and prevention programs at both the regional and national levels. Under the NANPCA, the Great Lakes became the first area where ballast water regulations were imposed.

- **Aquatic Nuisance Species Task Force (ANS Task Force)**

The ANS Task Force was established under Section 1201 of the 1990 NANPCA legislation and is an intergovernmental organization, made up of representatives from seven federal agencies. This task force is dedicated to the prevention and control of ANS and the implementation of the NANPCA. The main action of the ANS Task Force is the adoption of the cooperative ANS Program. The ANS Program seeks to prevent, detect, monitor, and control ANS.

- **National Invasive Species Act of 1996 (NISA)**

NANPCA was reauthorized through the National Invasive Species Act of 1996 (NISA). NISA expands the ballast management program to the national level and enhances other national monitoring, management and control programs.

- **Executive Order on Invasive Species**

President Clinton signed the Invasive Species Executive Order on Feb. 3, 1999, to help complement and build on existing federal authority to aid in the prevention and control of invasive species. President Clinton also proposed \$28.8 million in support in the FY2000 budget. The Great Lakes region welcomes the attention the Executive Order has drawn to the effects of ANS on the region.

- **Great Lakes Panel on Aquatic Nuisance Species**

Under NANPCA, the ANS Task Force requested that the Great Lakes Commission convene the Great Lakes Panel on ANS in accordance with Section 1203 of the Act. The Great Lakes Panel also works for the prevention and control of ANS in the Great Lakes and is made up of representatives from the United States and Canada, as well as the eight Great Lakes states, Ontario, Quebec, and various regional and local agencies.

- **Comprehensive State Management Plans**

Comprehensive State Management Plans are suggested for states seeking grants for ANS prevention and control under Section 1204 of NANPCA. Comprehensive State Management Plans are developed to identify management practices and measures for the prevention and control of ANS infestations in an environmentally sound manner. State management plans are submitted to the ANS Task Force for approval. Upon approval, states are eligible for grant money upon the recommendation of the Task Force. Thus far, plans have been approved for the Great Lakes states of New York, Michigan, and Ohio and for the St. Croix River Basin.

- **Great Lakes Action Plan for the Prevention and Control of Aquatic Nuisance Species**

The *Great Lakes Action Plan for the Prevention and Control of Aquatic Nuisance Species* is an attempt to establish a formal policy agreement that articulates a vision for the Great Lakes Basin. The Action Plan is a good faith agreement among its signatories, whose goal is the interjurisdictional cooperation and coordination of ANS prevention and control efforts.

- **Educational Outreach**

Various educational and outreach measures have been implemented to help raise public awareness of the threat posed by ANS. The state of Minnesota, in particular, has placed an emphasis on educating the public about the impacts of invasive species. The Minnesota Department of Natural Resources and the Minnesota Pollution Control Agency provide literature to the public to help them identify ANS, suggest ways to stop the spread of ANS, and provide information about laws pertaining to ANS, especially through the transport of prohibited species and infested water from one body of water to another.

The Minnesota Sea Grant Program is also active in educating the public about the impacts of ANS on the Minnesota ecosystem. The Sea Grant Program offers an even wider array of literature describing the threat of ANS. This educational material includes identification cards for various species; the cards include a detailed picture and description of the species, the areas the species are restricted to, what to do and who to contact if a specimen is found outside the listed area, and practices for reducing ANS transport between bodies of water. Other contributions from the Sea Grant Program include Traveling Trunks, Field Guides to ANS, and training packages providing details of individual ANS. A Three State Exotic Species Boater Survey, conducted in part by funding from the Minnesota Sea Grant Program, found that Minnesota put forth a substantial effort in getting out the message about ANS in an attempt to change boater behavior. Examples of such efforts in Minnesota include civil penalties for transporting ANS, road checks for the enforcement of regulations, and inspection or education programs at boat accesses to infested waters. In addition, ANS messages have been presented on billboards, the cover of the fishing regulations pamphlet, via the media, at conferences and workshops, at boat and sports shows, in fact sheets and brochures, and in educational packages distributed to lake and fishing associations.

Other programs in the Great Lakes area directed at educating the public about nonindigenous species and ANS include the following:

- National ANS Clearinghouse
 - The Sea Grant Nonindigenous Species Site (SGNIS)
 - The National Zebra Mussel Training Initiative
 - National Sea Grant College Program
 - Exotic Aquatics and Zebra Mussel Mania Traveling Trunk Program
 - Citizen Monitoring Program
 - Purple Loosestrife Project
 - Exotic Species Day Camp for Educators
- Detection and Monitoring Efforts

Detection and monitoring is also an important component of an ANS program. A need exists for a monitoring program that can act as an early warning device to facilitate prevention of other ANS poised to enter the Great Lakes ecosystem. Currently, the U.S. Fish and Wildlife Service maintains a surveillance program for monitoring the spread of ruffe and round goby. An important part of this program is public education. All new reports of ruffe and round goby are maintained in a national database by the U.S. Geological Survey's Alpena Fishery Resource Office. The Michigan Department of Natural Resources monitors Lake Huron fish stocks through two Great Lakes Research Stations on Lake Huron. At these stations, measured changes in fish stocks due to harmful invaders and other external sources are monitored, especially the progress of sea lamprey control assessed using lake trout wounding rates and recovery of lake trout stocks.

Lake Superior currently has several ruffe monitoring programs. The U.S. Fish and Wildlife Service has had ruffe populations under surveillance since 1992. Under this program, likely locations of ruffe populations are looked at; the range of ruffe is then monitored; and the status of peripheral populations is investigated. The Lake Superior Biological Station is also monitoring ruffe populations in the St. Louis River while the U.S. Fish and Wildlife Service has been observing changes in ruffe populations and those of associated fish communities since 1995.

Additional or expanded monitoring efforts are needed to help reduce the threat of future infestations by nonindigenous species.

A.2.15.2 Prevention and Control Efforts

The primary goal of all of the agencies and programs discussed above has been described as prevention and control, specifically, preventing further infestation by ANS and controlling existing ANS so that they do not continue to infest other lakes or waterways.

Prevention Activities

The primary focus of prevention efforts has been ballast water management, including a national ballast management program under NISA. The issue of ballast water in the introduction of nonindigenous species into the Great Lakes ecosystem is discussed in detail below.

All cargo ships contain huge ballast tanks. These tanks are filled in port to help steady ships as they travel, and they are emptied once cargo is loaded. Each tank can hold millions of gallons of water, which

can contain any and all of the aquatic life found in port waters and sediments; everything from bacteria and algae to worms and fish have been found in ballast water. All ships traveling into the Great Lakes are required to exchange ballast water in the open ocean prior to entry. However, despite the mandatory emptying of ballast tanks, organisms may establish permanent or semi-permanent communities in the layer of water and sediment that often remains at the bottom of the tanks. In these situations, adult organisms may reproduce and release larvae into ballast water, for eventual release in port, while adults remain in the sediment to reproduce further. In order to stop these harmful discharges, ships must take steps to avoid taking organisms into ballast tanks, to kill organisms during the voyage, or to avoid discharging organisms when ballast water is released (MIT 1999). To test for compliance with ballast water exchange requirements, the Coast Guard has the authority to randomly sample ballast water for salinity, which is subsequently compared with the salinity standard. The Coast Guard recognizes that salinity cannot be used as the only verification of open ocean exchange at a coastal port.

While adequate under many circumstances, ballast exchange poses safety, effectiveness, and accountability concerns that limit its scope and usefulness. The practice has particularly limited utility in the Great Lakes where most transoceanic vessels enter the system fully loaded with cargo and report no ballast on board (NOBOB). They nonetheless transport organisms into the Great Lakes system in the residual water and sediment in the “empty” ballast tanks. A tool box full of alternative prevention technologies and practices is needed to address the range of vessel types and voyage patterns of today's waterborne transportation. In the long term, these tools may be solutions such as a combination of microfiltration and ultraviolet light treatments, which can be installed or designed into vessels. Technologies such as these could more reliably resolve problems associated with fully loaded vessels (NOBOB vessels).

In an interim rule on implementation of NISA, which became effective July 1, 1999, the Coast Guard presented its position on NOBOB vessels. “A vessel with NOBOB may not have a large quantity of ballast water on board, but the vessel does retain sediment and residual ballast water. The Coast Guard requests in this regulation that all vessels remove sediments in an appropriate manner on a regular basis. We are working on identifying possible management methods to reduce the threat of a vessel operator claiming NOBOB. However, it would be premature to issue regulations specifically for these vessels at this time. To ask a vessel operator in a NOBOB status to conduct a ballast water exchange could destabilize a vessel, causing it to submerge its load line or compromise seaworthiness by exceeding hull girder stress limits, or increase the stresses on the hull to the point they fracture” (Coast Guard 1999).

Alternatives to ballast exchange as a means of control of organisms inhabiting ballast water include filtration, ultraviolet light, acoustics, salinity, heat, chemical biocides, sedimentation, pH treatment, oxygen deprivation, and discharge to reception vessels (Reeves 1996). Despite the available prevention technologies, it is unlikely such solutions will be implemented by the shipping industry without incentives or regulations. The Canadian Coast Guard has expressed a need for biological standards for ballast tanks. Without such a restriction, the Canadian Coast Guard does not foresee voluntary implementation of new technologies for ballast water treatment. This is a forward-looking initiative that will require participation of both the shipping industry and the ballast water management programs.

NISA Section 151.2035(b)(2) states that retaining ballast water on board is an option, and Section 151.2035(b)(4) states that discharging ballast water to an approved reception facility is another option. In order for the Coast Guard to approve a method alternative to ballast exchange, it must consider whether the method conforms to existing laws and standards, how effective the method is in reducing the viability of organisms within the vessel's ballast water, and how the vessel operator will verify that the system is operating as designed (Coast Guard 1999)

There are penalties for failing to comply with the Great Lakes ballast water provisions of NISA, including restriction of operation, revocation of Customs clearance, and possible civil and criminal penalties.

Other prevention programs in the Great Lakes include the following:

- Quick-response teams have been proposed that could be dispatched to an area where a newly introduced species has been reported. The team would try to prevent the spread of the species beyond the introduction point. At this time, planning of such a team has only been discussed, but is still viewed as an option for future consideration.

Control Activities

ANS can be controlled by several general methods, including chemical, biological, mechanical or physical, and habitat management practices. While each of these methods may provide effective control, each has disadvantages as well. The use of chemicals raises concerns about environmental safety and long-term impacts. Identification and screening of biological control agents invariably takes many years, and improperly screened biological control agents have themselves become nuisance species in the past. Mechanical or physical controls are often very expensive. No single method is likely to provide the necessary control of nonindigenous species. Hence, a comprehensive control strategy involving a combination of techniques is often necessary for an effective control program.

Various control mechanisms are currently being implemented in the Great Lakes. To help control the expansion of the goby into other waterways, river barrier systems are being implemented, along with public education programs. Unfortunately, no effective measures have been found to date to decrease established populations of gobies. The ruffe is the subject of the first control program developed under the “Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990.” The control program was implemented in 1992 and has successfully delayed the spread of ruffe through the Great Lake and inland waters. This success was obtained largely through the campaign to stop the transportation of the ruffe, both intentionally and unintentionally, between bodies of water, particularly by controlling the transport of ruffe in ballast water carried out of Lake Superior. The control of ruffe has been given a great amount of attention because if they do spread, ruffe will pose a threat to fisheries and aquatic ecosystems throughout much of eastern North America.

The sea lamprey has cost millions of dollars in losses to fisheries and in costs of control, in addition to the depletion or extirpation of lake trout stocks. In 1956, a joint program between the United States and Canadian governments was implemented to address the harmful impacts of the sea lamprey. The Great Lakes Fishery Commission (GLFC) was created by the *Convention on Great Lakes Fisheries* between the United States and Canada in 1955, and control of sea lampreys within the Great Lakes basin was one of the Commission’s principal responsibilities. The GLFC implemented sea lamprey control on the basis of an agreement between the United States and Canada decided on at the convention. The result was the development and application of an environmentally acceptable lampricide for use in controlling lamprey populations. Other mechanisms of control being used include mechanical and electrical barriers, and the experimental sterile-male-release technique. These methods have achieved some success in controlling sea lamprey populations in the Great Lakes. Populations of sea lampreys in Lake Superior have been reduced to 10 percent of their former abundance, and the lake trout, their major prey, have recovered to self-sustaining populations in several areas. In other areas, lamprey predation continues to be the limiting factor to recovery of lake trout.

While current activities have been moderately successful at preventing and controlling the effects of ANS, continued regulatory efforts and education programs are needed to help reduce the threat these species pose to the Great Lakes.

A.3 REGULATIONS

A.3.1 PCBs

In 1976, Congress charged EPA with responsibility for regulating the manufacturing, processing, distribution in commerce, and use of polychlorinated biphenyls (PCB). EPA issued the first set of regulations in 1977. Subsequently, Section 6(e)(3)(A) of the Toxic Substances Control Act (TSCA) (Pub. L. 94-969, 90 stat. 2003, 15 USC 2601 et. seq.) prohibited all manufacture and importation of PCBs after January 1, 1979. Currently, under TSCA regulations, the discharge of PCB-containing effluents and the production of PCBs in the United States is prohibited; disposal of materials contaminated by PCBs is regulated; as is the use of all PCB-containing materials still in service.

PCBs are regulated to some extent under the Clean Air Act, the CWA¹, the Safe Drinking Water Act, the Resource Conservation and Recovery Act, and the Comprehensive Environmental Response, Compensation, and Liability Act. However, TSCA Section 6(e) [15 USC 2605(e)] provides the primary regulatory framework for controlling how PCBs may be used, processed, distributed, manufactured, or exported or imported (40 CFR 761). In addition, TSCA specifies storage and disposal requirements and recordkeeping and reporting requirements. Under TSCA Section 6(e), all PCB uses or activities are banned unless they fit into one of the following categories: (1) totally enclosed systems, so as to ensure no significant exposure to human beings or the environment; (2) non-enclosed authorized uses listed at 40 CFR 761.30; or (3) exemptions as obtained via petition (for example, research uses). No authorized exemptions are required for (1) most products containing less than 50 parts per million (ppm) PCBs, or (2) certain inadvertent generation (as specifically defined) or for PCBs in certain recycled materials.

The disposal of PCBs is tightly regulated. Specifically, PCB waste must only be disposed of in facilities that are approved by EPA such as an incinerator with a PCB and removal destruction efficiency of 99.9999% or a landfill with adequate liners and leachate collection. Oils or metals contaminated with PCBs at less than 500 ppm can also be disposed of in boilers, furnaces, and smelters (these units must meet specific design and operating requirements), or in facilities which follow specific procedures to decontaminate the materials.

TSCA regulations require specific disposal methods that vary by the type and concentration of PCB items. In the U.S., the pollutant form determines the type of disposal options available. These options include:

- incineration in a regulated PCB incinerator
- disposal at a licensed chemical waste landfill
- disposal in a high efficiency boiler
- alternative disposal methods subject to EPA approval
- disposal as municipal solid waste
- decontamination
- unregulated disposal

EPA has approved several different methods for PCB disposal. Several PCB disposal companies operate a variety of commercially permitted disposal facilities throughout the U.S. and Canada. These companies offer PCB disposal related services that include the following:

¹ CWA Sections 307(a) and 311(b)(4) are the statutory sources for designation of PCBs as CERCLA hazardous wastes.

- incineration
- alternative thermal treatment
- chemical treatment
- physical separation
- pipeline removal
- PCB transformer decommissioning (disassembly/smelting)
- chemical waste landfills
- biological treatment

In addition to these approved facilities, some PCB waste may be disposed of in facilities which do not have a specific EPA permit such as a state approved municipal or non-municipal non-hazardous landfill or facility. EPA regulations impose a one year time limit on PCB items placed in storage for disposal and certain limitations on storage of PCBs intended to be reused.

PCB releases must be reported in the Toxic Release Inventory (TRI). On October 29, 1999, EPA issued a final rule effective December 31, 1999, which reduces the TRI reporting thresholds for PCB releases to 10 pounds per year (64 FR 58665; 40 CFR Part 372).

Table A-1. Management of PCBs in the Lake Michigan Basin

PCBs						
	Air	Soils / Sediments	Water	Biota	Waste	Reporting Requirements / Spills
Standards and Regulations	<p>Clean Air Act: Section 112(b) hazardous air pollutant; NESHAPS/MACT Standards (40 CFR Parts 61 and 63)</p>	<p>TSCA: Use, disposal, labeling, and management regulations (40 CFR Part 761); land disposal restrictions</p>	<p>SDWA: MCL = 0.0005 mg/L; MCLG = 0 mg/L (40 CFR Part 141)</p> <p>CWA: Section 307(a)(1) toxic pollutant; Section 304(a) priority pollutant with established water quality criteria; NPDES effluent limitations (40 CFR Part 122); general pretreatment standards (40 CFR Part 403)</p>	<p>No action level established under FDA</p>	<p>TSCA: Use, disposal, and management regulations (40 CFR Part 761)</p>	<p>SARA Section 313: PCB transfers and releases reported to TRI by qualifying facilities (40 CFR 372.65); reporting threshold > 10 lbs per year (64 FR 58665, 40 CFR Part 372)</p> <p>CERCLA Section 103: PCB reporting requirements for spills > 1 lb (40 CFR Part 302.4)</p>
Policy and Programs (nonregulatory actions)	<ul style="list-style-type: none"> - PCB Phasedown Program: Aims to obtain reduction commitments from PCB containing electrical equipment in EPA Region 5 - Remedial Action Plans - U.S. Automobile Pollution Prevention Project: Aims to reduce PCBs and Mercury from the automotive manufacturing sector - PCB Clean Sweeps: Collects PCB-contaminated material in the Great Lakes region - BNS Level 1 substance - PCB Action Plan: Currently being developed by EPA 					

A.3.2 DIOXINS AND FURANS

Dioxins and furans are included on the list of 189 HAPs under Section 112(b) of the Clean Air Act.² Several categories and subcategories of facilities have been identified for regulation pursuant to Section 112. Many facilities are subject to dioxin effluent limits or monitoring requirements in their NPDES permits. Limits for water discharges are based on the use of Best Available Technology economically achievable (BAT) for specific point sources.

The 1998 Final Pulp, Paper, and Paperboard “Cluster Rule” (63 FR 18504) sets new baseline limits for releases of toxics and nonconventional pollutants, including dioxins and furans, to air and water. NESHAPS require sources within the pulp and paper category to control dioxins using Maximum Achievable Control Technology (MACT), specifically emissions that occur during the pulping and bleaching processes. Water effluent limitations (under NPDES) and pretreatment standards require facilities within the Bleached Papergrade Kraft and Soda subcategory and the Papergrade Sulfite subcategory to limit, based on BAT, dioxins in the wastewater discharged during the bleaching process and in the final discharge from the mills. EPA projects that nationally, 155 of the 565 mills in the United States will be required to control toxic air pollutants and comply with MACT Standards, and that 96 of the 155 will additionally be subject to the effluent limitation guidelines and standards promulgated in the Pulp and Paper Cluster Rule (The Pulp and Paper Cluster Rule is under the statutory authority of section 112(b) of the Clean Air Act and Sections 304(b) and 307 of the CWA).

Dioxin- and furan-containing wastes and products are not RCRA-listed hazardous or toxic wastes. However, there are specific land disposal restrictions and treatment requirements for dioxin-containing wastes, in addition to wood preserving wastes (which often contain dioxins), under RCRA (40 CFR Part 268, Subpart C - Prohibitions on Land Disposal). RCRA also establishes a “Universal Treatment Standard” (40 CFR 268.48) for dioxin and furan levels in waste (wastewater and nonwastewater).

CERCLA Section 103(a) requires that any spills or releases of dioxin in quantities exceeding 1 pound must be reported immediately to the National Response Center (40 CFR 302.4).³ There are also dioxin reporting and testing requirements for specific industries (such as designated chemical manufacturers) under TSCA Sections 4 and 8(e) (40 CFR Part 766). Dioxin releases were not previously required to be reported in the TRI. However, dioxin and dioxin-like compounds were added to the list of substances regulated under Title III, Section 313 of SARA when EPA published the final rule on October 29, 1999. This amended rule, which became effective on December 31, 1999, sets a 0.1 gram (g) reporting threshold for dioxin and dioxin-like compounds (64 FR 58665, 40 CFR Part 372).

[Sources: EPA website <http://www.epa.gov/> and the Chem Alliance regulatory Handbook <http://www.chemalliance.org/RegTools/handbook.htm>]

² Dioxin is included in the “List of High Risk Pollutants,” 40 CFR Part 63, Table 1.

³ RCRA Section 3001 is the statutory source for designation of furan as a CERCLA hazardous waste.

Table A-2. Management of Dioxins and Furans in the Lake Michigan Basin

Dioxins and Furans						
	Air	Soils / Sediments	Water	Biota	Waste	Reporting Requirements / Spills
Standards and Regulations	<p>Clean Air Act: Section 112(b) hazardous air pollutant; NESHAPS / MACT Standards (40 CFR Parts 61 and 63)</p> <p>Pulp and Paper Cluster Rule: Pulp and paper mill emission standards (40 CFR Part 63, 40 CFR Part 261 and 40 CFR Part 430)</p>		<p>SDWA: Dioxin MCL = 3E-08 mg/L; MCLG = 0 mg/L (40 CFR Part 141)</p> <p>CWA: Section 307(a)(1) toxic pollutant; Section 304(a) priority pollutant with established water quality criteria; NPDES effluent limitations (40 CFR Part 122); general pretreatment standards (40 CFR Part 403)</p> <p>Pulp and Paper Cluster Rule: Pulp and paper mill effluent standards (40 CFR Part 261 and 40 CFR Part 430)</p>	No action level established under FFDCa	<p>RCRA: Universal treatment standards for dioxin levels in waste (40 CFR 268.58); furan designated hazardous waste (waste no. U124)</p>	<p>SARA Section 313: Reporting threshold = 0.1 g for dioxin and dioxin-like compounds with certain limitations (64 FR 58665; 40 CFR Part 372)</p> <p>CERCLA Section 103: Reporting requirements for spills > 1 lb (40 CFR 302.4)</p> <p>Furan designated EHS with a TPQ of 500 lbs</p>
Policy and Programs (nonregulatory actions)	<p>- Remedial Action Plans - Vinyl Institute Dioxin Characterization Program: Quantify potential releases from ethylene dichloride, vinyl chloride monomer, and PVC manufacturing</p>					

A.3.3 DIELDRIN/ALDRIN

The last remaining uses of aldrin and dieldrin have been canceled under FIFRA. Aldrin is no longer found as an active ingredient in any registered pesticides. EPA is currently developing a Pesticides Action Plan, to address dieldrin/aldrin.

Aldrin and dieldrin each have release reporting quantities under CERCLA of 1 pound.⁴

Any aldrin/dieldrin releases to any environmental media that occur as a result of manufacturing, processing, or otherwise using these substances must be reported in the TRI. Under amendments to 40 CFR Part 372 (the implementing regulations for SARA Section 313), reporting thresholds for aldrin releases have been lowered to 100 pounds per year (64 FR 58665 10/29/99). These changes became effective on December 31, 1999. In addition to TRI reporting requirements under EPCRA, Aldrin is listed as an Extremely Hazardous Substance (ENS), with a threshold planning quantity of 500/10,000 pounds (40 CFR Part 355, Appendix A).

Aldrin is also a listed hazardous waste under RCRA, Subtitle C hazardous waste management program (40 CFR 261.33). Pesticide-containing wastes (wastewater and nonwastewater) have land disposal restrictions, including Universal Treatment Standards for aldrin and dieldrin (40 CFR 268.48). Small quantities of dieldrin and aldrin may qualify for partial exclusion from hazardous waste regulations (40 CFR 261.5(e)).

[Sources: EPA website <http://www.epa.gov/> and the Chem Alliance Regulatory Handbook <http://www.chemalliance.org/RegTools/handbook.htm>]

⁴ The statutory sources for listing both aldrin and dieldrin as CERCLA hazardous substances are Sections 307(a) and 311(b)(4) of the CWA and Section 3001 of RCRA.

Table A-3. Management of Dieldrin/Aldrin in the Lake Michigan Basin

Dieldrin						
Standards and Regulations	Air	Soils / Sediments	Water	Biota	Waste	Reporting Requirements / Spills
Standards and Regulations	Clean Air Act: Not targeted	FIFRA: Use and registration restrictions; all uses canceled (40 CFR Subchapter E and USC CH6)	CWA: Section 307(a)(1) toxic pollutant; Section 304(a) priority pollutants with established water quality criteria; NPDES effluent limitations (40 CFR Part 122); general pretreatment standards (40 CFR Part 403) State Drinking Water Stds: Illinois 1 µg/L	FDA: FFDCa 0.03 ppm action level for fish tissue	RCRA: Designated hazardous wastes (aldrin waste no. P004; dieldrin waste no. P037); land disposal restrictions (40 CFR Part 268); groundwater monitoring requirements (40 CFR Part 264)	SARA Section 313: Releases reported to TRI by qualifying facilities (40 CFR 372.65); reporting threshold > 100 lbs per year (64 FR 58665; 40 CFR Part 372) CERCLA Section 103: Reporting requirements for spills > 1 lb (40 CFR 302.4)
Policy and Programs (nonregulatory actions)	<ul style="list-style-type: none"> - Superfund Program - Remedial Action Plans - Pesticides Clean Sweeps - BNS Level 1 substance - Level 1 Pesticides Action Plan: Currently being developed by EPA 					

A.3.4 CHLORDANE

Chlordane is a member of the class of chlorinated organic pesticides. Regulatory actions related to chlordane use in agriculture began in 1978. All aboveground uses were halted in the United States by 1983. Between 1983 and 1988, the sole registered use of chlordane was for subterranean control of termites. By 1988, all commercial uses of chlordane were canceled. In 1995, Velsicol, the sole U.S. manufacturer, voluntarily canceled its export registration, and by 1997, Illinois completely stopped all production in the United States and abroad and exported all existing stocks (NARAP 1997a).

Chlordane is included in the CAA Title III list of 189 HAPs and will be subject to standards established under Section 112, including MACT standards (40 CFR Parts 61 and 63). It is included on the Clean Air Act "List of High Risk Pollutants" (40 CFR Part 63, Table 1). Chlordane is a designated priority pollutant under the CWA Section 307, and facilities are potentially subject to chlordane effluent limits on their NPDES permits.

Chlordane is listed as a hazardous waste under the RCRA, Subtitle C hazardous waste management program (40 CFR 261.33). Pesticide-containing wastes (wastewater and nonwastewater) have land disposal restrictions, including Universal Treatment Standard levels for chlordane (40 CFR 268.48).

Chlordane is subject to a 1 pound release reporting quantity under CERCLA.⁵ Chlordane releases to any environmental media must also be reported in the TRI. Effective December 31, 1999, the TRI reporting thresholds for chlordane releases was lowered to 10 pounds per year (64 FR 58665, 40 CFR Part 372).

[Sources: EPA website <http://www.epa.gov/> and the Chem Alliance regulatory Handbook, <http://www.chemalliance.org/RegTools/handbook.htm>]

⁵ Statutory sources for designation of chlordane as a CERCLA hazardous waste are Sections 307(a) and 311(b)(4) of the CWA and Section 3001 of RCRA.

Table A-4. Management of Chlordane in the Lake Michigan Basin

	Air	Soils / Sediments	Water	Biota	Waste	Reporting Requirements / Spills
Standards and Regulations	<p>Clean Air Act: Section 112(b) hazardous air pollutant; NESHAPS/MACT Standards (40 CFR Parts 61 and 63); Designated high risk pollutant (40 CFR Part 63 Table 1)</p>	<p>FIFRA: Use and registration restrictions; all uses canceled (40 CFR Subchapter E and USC CH6)</p>	<p>SDWA: MCL = 0.002 mg/L; MCLG = 0 mg/L (40 CFR Part 141)</p> <p>CWA: Section 307(a)(1) toxic pollutant; Section 304(a) priority pollutant with established water quality criteria; NPDES effluent limitations (40 CFR Part 122); general pretreatment standards (40 CFR Part 403)</p>	<p>FDA: FFDCa 0.03 ppm action level for fish tissue</p>	<p>RCRA: Designated hazardous waste (No. U036); land disposal restrictions (40 CFR Part 268); groundwater monitoring requirements (40 CFR Part 264)</p>	<p>SARA Section 313: Releases reported to TRI by qualifying facilities (40 CFR 372.65); reporting threshold > 10 lbs per year (64 FR 58665, 40 CFR Part 372); EHS with TPQ 1,000 lbs (40 CFR Part 355)</p> <p>CERCLA Section 103: Reporting requirements for spills > 1 lb (40 CFR 302.4)</p>
Policy and Programs (nonregulatory actions)	<ul style="list-style-type: none"> - Remedial Action Plans - Clean Sweeps - Velsicol Chemical Corporation voluntary ceased production in 1997. - Council of Great Lakes Industry: Searching for information regarding the export, storage, and use as chemical intermediates of Level I pesticides - BNS Level 1 substance - Level 1 Pesticides Action Plan: Currently being developed by EPA 					

A.3.5 DDT AND METABOLITES

DDT is a broad spectrum insecticide previously used on crops, grazing lands, forests, and urban areas to control insects that transmit diseases such as malaria and typhus. All non-health uses were canceled by 1973; the last remaining uses (public health use for control of vector-borne diseases, USDA or military use for health quarantine, and use in prescription drugs for control of body lice) were canceled by October 1989.

While there is no final CERCLA release reporting quantity for the generic class “DDT and metabolites,” DDT, DDD, and DDE are all identified separately as CERCLA hazardous substances with reporting quantities of 1 lb each (40 CFR 302.4).⁶ DDT and DDD are listed on the RCRA hazardous waste U List.

DDT and its metabolites are not targeted by the Clean Air Act but are subject to ambient water quality criteria, NPDES effluent limitations, and pretreatment standards under the CWA.

⁶ The statutory source for designating DDT and DDD as CERCLA hazardous substances are Sections 307(a) and 311(b)(4) of the CWA and Section 3001 of RCRA. The statutory source for designating DDE as a CERCLA hazardous substance is Section 307(a) of the CWA.

Table A-5. Management of DDT and Metabolites in the Lake Michigan Basin

DDT						
	Air	Soils / Sediments	Water	Biota	Waste	Reporting Requirements / Spills
Standards and Regulations	<p>Clean Air Act: DDE designated Section 112(b) hazardous air pollutant</p>	<p>FIFRA: Use and registration restrictions; all uses canceled (40 CFR Subchapter E and USC CH6)</p>	<p>CWA: Section 307(a)(1) toxic pollutants; Section 304(a) priority pollutants with established water quality criteria; NPDES effluent limitations (40 CFR Part 122); general pretreatment standards (40 CFR Part 403)</p> <p>State Drinking Water Standards: Illinois = 50 µg/L</p>	<p>FDA: FFDCA 5 ppm action level for fish tissue</p>	<p>RCRA: DDT and DDD designated hazardous waste (DDT No. U061; DDD No. U060); designated hazardous waste; land disposal restrictions (40 CFR Part 268); groundwater monitoring requirements (40 CFR Part 264)</p>	<p>CERCLA Section 103: Reporting requirements for spills > 1 lb (40 CFR 302.4)</p>
Policy and Programs (nonregulatory actions)	<ul style="list-style-type: none"> - Clean Sweeps - Council of Great Lakes Industry BNS Implementation: Searching for information regarding the export, storage, and use as chemical intermediates of Level I pesticides - Remedial Action Plans 					

A.3.6 MERCURY

Mercury and mercury compounds are included in the CAA Title III list of HAPs and will be subject to standards established under Section 112, including MACT standards (40 CFR Parts 61 and 63). In addition, mercury is a designated high risk pollutant under the CAA (40 CFR Part 63 Table 1). Other sections of the CAA that may require data on mercury emissions include the electric utility steam-generating units, Section 112(n)(1)(A); the National Institute of Environmental Health Sciences (NIEHS) health effects study, Section 112(n)(1)(B); the mercury report to Congress, Section 112(n)(1)(C); the Great Waters Program, Section 112(m); the National Academy of Sciences (NAS) risk assessment methodology study, Section 112(o)(1); the area source program, Section 112(k); and the solid waste combustion program, Section 129.

Many facilities are subject to mercury effluent limits or monitoring requirements in their NPDES permits, and requirements are not limited to those specific sources listed in the CWA.

Mercury releases are subject to CERCLA reporting requirements when releases exceed 1 lb (40 CFR 302.4).⁷

Mercury is also regulated under the RCRA, Title C, Hazardous Waste Management Program (40 CFR 261.33). All mercury-containing wastes have land disposal restrictions, and the specified treatment for these wastes is incineration or thermal processing (40 CFR 268.42). Under the land disposal restrictions, RCRA establishes Universal Treatment Standards for mercury in wastes, including wastewater and nonwastewater (40 CFR 268.48).

Section 313 of Title III of SARA requires that mercury releases to any environmental media be reported in the TRI. TRI reporting thresholds for mercury emissions were lowered to 10 pounds per year under the final rule, which became effective on December 31, 1999 (64 FR 58665, 40 CFR Part 372). As part of SARA Section 313, EPA provides public access to the annual emissions data.

[Source: Ross & Associates Environmental Consulting, Ltd. *Mercury Sources and Regulations: Background Information for the Virtual Elimination Pilot Project*. September 1994, unless otherwise indicated.]

⁷ The statutory sources for designation of mercury as a CERCLA hazardous substance are the Clean Air Act Section 112, CWA Section 307(a), and RCRA Section 3001.

Table A-6. Management of Mercury in the Lake Michigan Basin

Mercury						
	Air	Soils / Sediments	Water	Biota	Waste	Reporting Requirements / Spills
Standards and Regulations	<p>Clean Air Act: Mercury compounds designated section 112(b) hazardous air pollutant; NESHAPS/MACT standards (40 CFR parts 61 and 63); mercury compounds designated high risk pollutants (40 CFR Part 63 Table 1)</p>	<p>FIFRA: Cancellation of phenylmercuric acetate for use as fungicide in plants</p>	<p>SDWA: MCL for inorganic mercury = 0.002 mg/L; MCLG for inorganic Hg = 0.002 mg/L (40 CFR Part 141)</p> <p>CWA: Section 307(a)(1) toxic pollutant; Section 304(a) priority pollutant with established water quality criteria; NPDES effluent limitations (40 CFR Part 122); general pretreatment standards (40 CFR Part 403); biosolids rules</p>	<p>FDA: FFDCA 1 ppm action level for fish tissue (for methyl mercury)</p>	<p>RCRA: Designated hazardous waste; land disposal restrictions (40 CFR Part 268); groundwater monitoring requirements (40 CFR Part 264)</p>	<p>SARA Section 313: Releases reported to TRI by qualifying facilities (40 CFR 372.65); Reporting threshold > 10 lbs per year (40 CFR Part 372)</p> <p>CERCLA 103: Reporting requirements for spills > 1 lb in organic mercury (40 CFR 302.4)</p>
Policy and Programs (nonregulatory actions)	<ul style="list-style-type: none"> - Remedial Action Plans - U.S. Automobile Pollution Prevention Project: Reduce PCBs and mercury from automotive manufacturing sector - Clean Sweeps - Chlorine Institute: Committed to reduce mercury use in chlor-alkali industry by 50 percent from 1990 to 1995 levels - Memorandum of Understanding: EPA and the American Hospital Association's commitments to work toward virtual elimination of mercury from hospital waste - Lake Michigan Primary Metals Project: Agreement to reduce mercury in 3 northwest Indiana steel mills, spearheaded by BNS Mercury Workgroup - Workshop on Potential Mercury Reductions at Electrical Utilities: BNS Workgroup's effort to reduce mercury emissions at electric utilities - Action Plan for Mercury: Recently developed by EPA 					

A.3.7 METALS

Most metals are regulated pursuant to the CWA, SDWA, RCRA, and CERCLA. All are designated toxic pollutants pursuant to Section 307(a)(1) of the CWA and priority pollutants pursuant to Section 304(a) of the CWA. As priority pollutants, all metals are subject to water quality criteria. On October 29, 1999, EPA issued a notice of intent to revise the aquatic life criteria for lead, cadmium, and copper (64 FR 58409). All are subject to NPDES effluent limitations (40 CFR Part 122) and to general pretreatment standards (40 CFR Part 403). All are also subject to MCLs and goals pursuant to the SDWA (40 CFR Part 141).

The CAA designates lead compounds, cadmium compounds and chromium compounds as HAPs pursuant to Section 112(b). These metals are subject to NESHAPS and MACT standards (40 CFR Parts 61 and 63). In addition, cadmium compounds and chromium compounds are designated high risk pollutants (40 CFR Part 63 Table 1).

All of the metals are designated CERCLA hazardous substances with various reporting quantities. However, reporting under CERCLA is not required if a release of cadmium, copper, zinc, or chromium involves pieces of solid metal that are equal to or greater than 100 micrometers (0.0004 inches) in diameter.

Lead is subject to TRI reporting requirements. EPA recently published a proposed rule to lower the reporting threshold of lead and lead compounds to 10 pounds (64 FR 42221).

Pursuant to RCRA, lead, cadmium, zinc, and chromium are subject to land disposal restrictions (40 CFR Part 261). In addition, lead, cadmium, and zinc are subject to groundwater monitoring requirements (40 CFR Part 264).

Cadmium is a Level II substance under the Binational Toxics Strategy.

Table A-7. Management of Lead in the Lake Michigan Basin

Lead						
	Air	Soils / Sediments	Water	Biota	Waste	Reporting Requirements / Spills
Standards and Regulations	<p>Clean Air Act: Lead compounds designated Section 112(b) hazardous air pollutants; NESHAPS/MACT standards (40 CFR Parts 61 and 63)</p>		<p>SDWA: MCL lead at tap action level = 0.015 mg/L; MCLG = 0 mg/L (40 CFR Part 141)</p> <p>CWA: Section 307(a)(1) toxic pollutant; Section 304(a) priority pollutant with water quality criteria; NPDES effluent limitations (40 CFR Part 122); General pretreatment standards (40 CFR Part 403)</p>		<p>RCRA: May be characterized as hazardous waste; land disposal restrictions (40 CFR 261.24); groundwater monitoring requirements (40 CFR Part 264)</p>	<p>CERCLA Section 103: Reporting requirements for spills > 10 lbs (40 CFR 302.4)</p>
Policy and Programs (nonregulatory actions)						

Table A-8. Management of Cadmium in the Lake Michigan Basin

Cadmium						
	Air	Soils / Sediments	Water	Biota	Waste	Reporting Requirements / Spills
Standards and Regulations	Clean Air Act: Cadmium compounds designated Section 112(b) hazardous air pollutants; NESHAPS/MAC T standards (40 CFR Parts 61 and 63); Cadmium compounds designated high risk pollutants (40 CFR Part 63 Table 1)		SDWA: MCL = 0.005 mg/L; MCLG = 0.005 mg/L (40 CFR Part 141) CWA: Section 307(a)(1) toxic pollutant; Section 304(a) priority pollutant with established water quality criteria; NPDES effluent limitations (40 CFR Part 122); general pretreatment standards (40 CFR Part 403)		RCRA: Characterized as hazardous waste; land disposal restrictions (40 CFR 261.24); groundwater monitoring requirements (40 CFR Part 264)	CERCLA Section 103: Spills > 10 lbs must be reported (40 CFR 302.4) ⁸
Policy and Programs (nonregulatory actions)	- BNS Level II substance					

⁸ There is no reporting requirement where the diameter of the pieces of solid metal released is greater than or equal to 100 micrometers (0.0004 inches) in diameter.

Table A-9. Management of Copper in the Lake Michigan Basin

Copper						
	Air	Soils / Sediments	Water	Biota	Waste	Reporting Requirements / Spills
Standards and Regulations	Clean Air Act: Not targeted		SDWA: MCL at tap action level = 1.3 mg/L; MCLG = 1.3 mg/L (40 CFR Part 141) CWA: Section 307(a)(1) toxic pollutant; Section 304(a) priority pollutant with established water quality criteria; NPDES effluent limitations (40 CFR Part 122); general pretreatment standards (40 CFR Part 403)			CERCLA Section 103: Reporting requirements for spills > 5,000 lbs (40 CFR 302.4) ⁹
Policy and Programs (nonregulatory actions)						

⁹ There is no reporting requirement where the diameter of the solid metal pieces released is greater than or equal to 100 micrometers (0.0004 inches).

Table A-10. Management of Zinc in the Lake Michigan Basin

Zinc						
	Air	Soils / Sediments	Water	Biota	Waste	Reporting Requirements / Spills
Standards and Regulations	<p>Clean Air Act: Not targeted</p>		<p>SDWA: Zinc is listed for regulation; Secondary MCL = 5 mg/L for elemental zinc and zinc compounds 40 CFR Part 141)</p> <p>CWA: Section 307(a)(1) toxic pollutant; Section 304(a) priority pollutant with established water quality criteria; NPDES effluent limitations (40 CFR Part 122); general pretreatment standards (40 CFR Part 403)</p> <p>State Drinking Water Stds: Illinois = 5 mg/L</p>		<p>RCRA: May be characterized as hazardous waste; land disposal restrictions (40 CFR 261.24); groundwater monitoring requirements (40 CFR Part 264)</p>	<p>CERCLA Section 103: Reporting requirements for spills > 1,000 lbs for elemental zinc (40 CFR 302.4)</p>
Policy and Programs (nonregulatory actions)						

Table A-11. Management of Chromium in the Lake Michigan Basin

Chromium						
	Air	Soils / Sediments	Water	Biota	Waste	Reporting Requirements / Spills
Standards and Regulations	<p>Clean Air Act: Chromium compounds designated Section 112(b) hazardous air pollutants; NESHAPS/MAC T standards (40 CFR Parts 61 and 63); chromium compounds designated high risk pollutants (40 CFR Part 63 Table 1)</p>		<p>SDWA: Total chromium MCL = 0.1 mg/L; total chromium MCLG = 0.1 mg/L (40 CFR Part 141)</p> <p>CWA: Section 307(a)(1) toxic pollutant; Section 304(a) priority pollutant with established water quality criteria; NPDES effluent limitations (40 CFR Part 122); general pretreatment standards (40 CFR Part 403)</p>		<p>RCRA: May be characterized as hazardous waste; Land disposal restrictions (40 CFR 261.24)</p>	<p>CERCLA Section 103: Reporting requirements for spills (40 CFR 302.4)</p>
Policy and Programs (nonregulatory actions)						

A.3.8 ARSENIC

Pursuant to CERCLA, several arsenic compounds have been designated as hazardous substances. The owner or operator of any facility that produces, uses, or stores any CERCLA hazardous substance in an amount exceeding the reporting quantity of 1 pound is required to immediately report any release to any environmental media of the substance. Approximately 11 arsenic compounds are designated as “hazardous substances” under Sections 101(4) and 102(a) of CERCLA and must meet the requirements for reporting releases to the environment in accordance with 40 CFR 302.4.

Under EPCRA, several arsenic compounds are designated “extremely hazardous substances” with a threshold planning quantity of 1 pound. Releases of more than 1 pound of arsenic and arsenic compounds into the air, water, or land must be reported annually to the TRI database.

Inorganic arsenic compounds have been identified and listed as HAPs under Section 112(b) of the Clean Air Act. The source categories to which emission standards for arsenic apply include primary copper and lead smelters and glass manufacturing plants.

Under RCRA requirements, a solid waste containing arsenic may be characterized as a hazardous waste when subjected to the Toxicant Extraction Procedure listed in 40 CFR 261.24, and if so characterized, must be managed in accordance with federal and state hazardous waste regulations. For wastewaters identified by the hazardous waste code D004, a universal treatment standard of 1.4 mg/L for arsenic has been established.

To protect the groundwater within the boundaries of hazardous waste treatment, storage, or disposal facilities, the EPA has included arsenic on a list of hazardous constituents to be regulated through permissible concentration limits. The concentration of arsenic in groundwater within the boundaries of a facility must not exceed 0.05 mg/L, as long as the background concentration is below this value.

Pursuant to the CWA, arsenic and arsenic compounds are regulated under effluent limitation guidelines for existing sources, standards for performance for new sources, and pretreatment standards for new and existing sources. The point source categories for which arsenic and arsenic compounds are regulated include inorganic chemical manufacturing, nonferrous metals manufacturing, timber products processing, and electrical and electronic components manufacturing.

Under the SDWA, EPA determined the MCL for arsenic to be 0.05 mg/L. This value is presently undergoing review by the EPA as part of a rulemaking to establish a new MCL for arsenic. The World Health Organization (WHO) has established a provisional guideline value of 0.01 mg/L for arsenic in drinking water.

Arsenic levels in the workplace are regulated by Occupational Safety and Health Administration (OSHA). OSHA has established a maximum permissible exposure limit (PEL) of 10 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) for organic arsenic over an 8-hour work shift in various workplaces where arsenic is used. The National Institute for Occupational Safety and Health (NIOSH) recommends that employee exposure to airborne arsenic should not exceed 0.002 milligrams per cubic meter (mg/m^3) for a 15-minute sampling period. The American Conference of Governmental Industrial Hygienists (ACGIH) recommends that employee exposure to airborne arsenic should not exceed 0.2 mg/m^3 averaged over an 8-hour work shift.

The FDA issues permissible levels of arsenic in muscle meats, edible meat by-products, and eggs. The permissible level of arsenic in muscle tissue is 0.5 ppm. Bottled water must meet the standards of chemical quality and shall not contain arsenic in excess of 0.05 mg/L.

[Sources: ATSDR website <http://atsdr.cdc.gov/>; the National Safety Council; Environmental Health Center website <http://www.nsc.org/>; EPA website <http://mail.odsnet.com/TRIFacts/>; and USDHHS 1998 Toxicological Profile for Arsenic.]

Table A-12. Management of Arsenic in the Lake Michigan Basin

Arsenic						
	Air	Soils / Sediments	Water	Biota	Waste	Reporting Requirements / Spills
Standards and Regulations	<p>Clean Air Act: Arsenic compounds designated Section 112 hazardous air pollutants; NESHAPS / MACT standards for emissions from copper and lead smelters and glass manufacturers (40 CFR Parts 61 and 63); Arsenic compounds designated high risk pollutants (40 CFR Part 63 Table 1)</p> <p>OSHA: PEL 10 μm^3 for an 8-hour work shift</p> <p>NIOSH: 0.002 mg/m³ for a 15-minute sampling</p>	<p>FIFRA: Many pesticide uses of inorganic arsenicals canceled or restricted</p>	<p>SDWA: MCL 0.05mg/L (currently under review) (40 CFR Part 141)</p> <p>CWA: Section 304(a) priority pollutant with established water quality criteria; NPDES effluent limitations (40 CFR Part 122); general pretreatment standards (40 CFR Part 403)</p> <p>WHO: 0.01 mg/L</p> <p>UTS: 1.4 mg/L</p> <p>TSDF Groundwater: 0.05 mg/L</p>	<p>FDA: 0.5 ppm in uncooked muscle tissue and 0.05 mg/L in bottled water</p>	<p>RCRA: Designated hazardous waste; land disposal restrictions (40 CFR Part 268); groundwater monitoring requirements (40 CFR Part 264)</p>	<p>SARA Section 313: Arsenic releases reported to TRI by qualifying facilities (40 CFR 372.65)</p> <p>CERCLA Section 103: Reporting requirements for spills >1 lb (40 CFR 302.4)¹⁰</p>
Policy and Programs (nonregulatory actions)						

¹⁰ No reporting of releases required where the diameter of the solid metal pieces released is greater than or equal to 100 micrometers (0.0004 inches).

A.3.9 CYANIDE

Under the Safe Drinking Water Act of 1974, EPA determined the safe level of cyanide in drinking water. The MCLG for cyanide is 0.2 ppm and the enforceable MCL is 0.2 ppm. The regulation for cyanide became effective in 1992. Between 1993 and 1995, EPA required public water suppliers to collect water samples once and analyze them to find out if cyanide exceeded the 0.2 ppm MCL. If cyanide was present above this level, the public water system was required to continue to monitor this contaminant every 3 months. If contaminant levels were consistently above the MCL, the water supplier was then required to take steps to reduce the amount of cyanide to ensure that the MCL was not exceeded. The following treatment methods have been approved by EPA for removing cyanide from drinking water: ion exchange, reverse osmosis, and chlorine.

Hydrogen cyanide is sometimes used to treat food after it is harvested to prevent pest damage. The EPA allows levels of cyanide in food ranging from 25 ppm in dried beans, peas, and nuts to 250 ppm in spices.

Cyanide levels in the workplace are regulated by OSHA. OSHA has a legally enforceable exposure limit of 5 milligrams per cubic centimeter (mg/cm^3) for cyanide and 11 mg/cm^3 (or 10 ppm) hydrogen cyanide in air for an 8-hour workday, 40-hour work week. NIOSH recommends that employee exposure to hydrogen cyanide and cyanide salts not exceed 5 mg/m^3 in air for a 10-minute sampling period.

[Sources: ATSDR website <http://atsdr.cdc.gov/ToxProfiles/> ; and EPA website <http://www.epa.gov/OGWDW/dwh/c-ioc/cyanide>]

Table A-13. Management of Cyanide in the Lake Michigan Basin

Cyanide						
	Air	Soils / Sediments	Water	Biota	Waste	Reporting Requirements / Spills
Standards and Regulations	<p>Clean Air Act: Cyanide compounds designated Section 112(b) hazardous air pollutants</p> <p>OSHA: 5 mg/cm³ for cyanide exposure in 8 hr workday, 40 hr work week; 11 mg/cm³ for hydrogen cyanide exposure in 8 hr workday, 40 hr work week</p>		<p>SDWA: MCL = 0.2 mg/L; MCGL = 0.2 mg/L (40 CFR Part 141)</p> <p>CWA: Section 307(a)(1) toxic pollutant; Section 304(a) priority pollutant with established water quality criteria; NPDES effluent limitations (40 CFR Part 122); general pretreatment standards (40 CFR Part 403)</p>		<p>RCRA: May become characterized as hazardous waste (40 CFR 261.33)</p>	<p>CERCLA Section 103: Reporting requirements for spills >10 lb (42 USC 9601 and 40 CFR 302.4); potassium cyanide and hydrogen cyanide are designated EHSs with TPQs of 100 lbs (40 CFR Part 355)</p>
Policy and Programs (nonregulatory actions)						

A.3.10 HEXACHLOROBENZENE

Hexachlorobenzene (HCB) is included in the Title III list of HAPs and will be subject to standards established under Section 112, including MACT standards (40 CFR Parts 61 and 63). Other sections of the Clean Air Act that may require data on HCB emissions include sections of the Great Waters Program. Proposed NESHAPs for the source category of pesticide active ingredient production are expected to reduce emissions of HAPs, including HCB.

HCB is a CWA listed priority pollutant (40 CFR Part 423). Many facilities are subject to HCB effluent limitations or monitoring requirements in their NPDES permits, and requirements are not limited to those specific sources listed in the CWA.

HCB is also regulated under RCRA as a toxic waste under the Subtitle U, Hazardous Waste Management Program (40 CFR 261.33). HCB-containing wastes are subject to land disposal restrictions; the proposed disposal method is incineration or thermal processing (40 CFR 268.40). Under the land disposal restrictions, RCRA establishes Universal Treatment Standards for HCB in wastes (40CFR 268.48).

HCB is subject to Section 313 of Title III of SARA, requiring reporting of HCB releases to air, water, or land to the TRI database. TRI reporting thresholds for HCB emissions have been lowered to 10 lbs per year under a rule finalized on October 29, 1999 (64 FR 58665, 40 CFR Part 372). As part of SARA Section 313, EPA provides public access to the annual emissions data.

EPA is currently developing an HCB Action Plan.

Table A-14. Management of HCB in the Lake Michigan Basin

HCB						
	Air	Soils / Sediments	Water	Biota	Waste	Reporting Requirements / Spills
Standards and Regulations	<p>Clean Air Act: Section 112(b) hazardous air pollutant; NESHAPS / MACT Standards (40 CFR Parts 61 and 63); designated high risk pollutant (40 CFR Part 63 Table 1)</p>	<p>TSCA: Use, disposal, and management regulations (40 CFR Part 761)</p> <p>FIFRA: Use and registration restrictions; voluntarily canceled (40 CFR Subchapter E and USC CH6)</p>	<p>SDWA: MCL = 0.001 mg/L; MCGL = 0 mg/L (40 CFR Part 141)</p> <p>CWA: Chlorinated benzenes designated Section 307(a)(1) toxic pollutants; Section 304(a) priority pollutant with established water quality criteria; NPDES effluent limitations (40 CFR Part 122); general pretreatment standards (40 CFR Part 403)</p>	<p>No action level established under FFDCA</p>	<p>RCRA: Designated hazardous waste (waste no. U127); land disposal restrictions (40 CFR Part 268); groundwater monitoring requirements (40 CFR Part 264); Small quantity generator exclusion (40 CFR 261.5)</p>	<p>SARA Section 313: Releases of greater than 10 lbs reported to TRI by qualifying facilities (64 FR 58665, 40 CFR Part 372)</p> <p>CERCLA 103: Reporting requirements for spills > 10 lbs (40 CFR 302.4)</p>
Policy and Programs (nonregulatory actions)	<ul style="list-style-type: none"> - Binational Toxics Strategy Level 1 substance - Bioaccumulative Chemical of Concern (BCC) under the Great Lakes Water Quality Guidance - Remedial Action Plans - Great Lakes Regional Air Toxic Emissions Inventory Project - Integrated Atmospheric Deposition Network (IADN) - Atmospheric Deposition to Great Lakes and Coastal Waters (Great Waters Program) - HCB Action Plan: Currently being developed by EPA 					

A.3.11 TOXAPHENE

All pesticide uses of toxaphene were canceled in 1982, except (1) in emergency situations for controlling livestock ecto parasites, and (2) to control grasshoppers and army worm infestations on cotton, corn, and small grains in the continental United States, and on bananas and pineapple crops in Puerto Rico and the Virgin Islands. The remaining U.S.-registered uses of toxaphene were canceled in 1990. In addition, EPA prohibited the importation of food containing toxaphene residues in 1993.

Toxaphene is included in the Clean Air Act Title III list of 189 HAPs and will be subject to air quality standards established under Section 112, including MACT standards (40 CFR Parts 61 and 63).

As toxaphene is a designated priority pollutant under the CWA, facilities may be subject to toxaphene effluent limitations or monitoring requirements in their NPDES permits. In addition, toxaphene is considered a toxic pollutant under CWA Section 307, and as such, has established toxic pollutant effluent standards that may also be incorporated into any NPDES permit (40 CFR Part 129).

Toxaphene is a listed hazardous waste under RCRA, Subtitle C hazardous waste management program (40 CFR 261.33). Toxaphene-containing wastes (wastewater and nonwastewater) have land disposal restrictions, including Universal Treatment Standards (40 CFR 268.48). Toxaphene is also included in groundwater monitoring requirements for disposal facilities (40 CFR 264.94).

Under the recently amended rule, toxaphene releases must be reported in the TRI database when they exceed the reporting threshold of 10 lbs per year (64 FR 58665, 40 CFR Part 372).

Toxaphene is a BNS Level 1 substance and is a targeted pesticide in the Level 1 Pesticides Action Plan currently being developed by EPA.

[Sources: EPA website <http://www.epa.gov/> and the Chem Alliance regulatory Handbook <http://www.chemalliance.org/RegTools/handbook.htm>.]

Table A-15. Management of Toxaphene in the Lake Michigan Basin

Toxaphene						
	Air	Soils / Sediments	Water	Biota	Waste	Reporting Requirements / Spills
Standards and Regulations	Clean Air Act: Section 112(b) hazardous air pollutant; NESHAPS / MACT Standards (40 CFR Parts 61 and 63); designated high risk pollutant (40 CFR Part 63 Table 1)	FIFRA: Use and registration restrictions; voluntarily canceled (40 CFR Subchapter E and USC CH6)	SDWA: MCL = 0.003 mg/L; MCLG = 0 mg/L(40 CFR Part 141) CWA: Section 307(a)(1) toxic pollutant; Section 304(a) priority pollutant with established water quality criteria; NPDES effluent limitations (40 CFR Part 122); general pretreatment standards (40 CFR Part 403)	FDA: Action level for fish 5.0 ppm established under FFDCa	RCRA: Designated hazardous waste (waste no. P123); land disposal restrictions (40 CFR Part 268); groundwater monitoring requirements (40 CFR Part 264)	SARA Section 313: Releases in excess of 10 lbs/yr reported to TRI by qualifying facilities (64 FR 58665, 40 CFR 372.65); designated EHS with TPQ 500/10,000 lbs (40 CFR Part 355) CERCLA Section 103: Reporting requirements for spills > 1 lb (40 CFR 302.4)
Policy and Programs (nonregulatory actions)	<ul style="list-style-type: none"> - Binational Toxics Strategy (BNS) Level 1 substance - Bioaccumulative Chemical of Concern (BCC) under the Great Lakes Water Quality Guidance - Remedial Action Plans - Included in the North American Free Trade Agreement Technical Working Group on Pesticides - Integrated Atmospheric Deposition Network (IADN) (at some stations) - Atmospheric Deposition to Great Lakes and Coastal Waters (Great Waters Program under the Clean Air Act) - Level 1 Pesticides Action Plan: Currently being developed by EPA - Pesticides Clean Sweeps Programs 					

A.3.12 POLYCYCLIC AROMATIC HYDROCARBONS (PAHs)

PAHs are a group of naturally occurring organic chemicals which exist in more than 100 forms. Pure chemical PAHs are used in medicines, dyes, plastics, pesticides, asphalt, crude oil, coal tar pitch, creosote, and roofing tar. The majority of PAH contamination is formed through the incomplete combustion of organic materials and fossil fuels. There are five PAHs listed for commercial or industrial use by the ATSDR: anthracene, acenaphthene, fluorene, phenanthrene, and fluoranthene.

PAHs are regulated under the CWA as designated toxic pollutants (Section 307(a)(1)) and as priority pollutants (Section 304(a)). In addition, they are subject to effluent limitations in NPDES permits and general pretreatment standards. Benz(a)pyrene is regulated under the Safe Drinking Water Act. Qualifying facilities must report releases of PAHs to TRI. There are no known regulations of PAHs in the CAA or RCRA.

Table A-16. Management of PAHs in the Lake Michigan Basin

PAHs						
	Air	Soils / Sediments	Water	Biota	Waste	Reporting Requirements / Spills
Standards and Regulations	Clean Air Act: No known requirements		SDWA: Benz(a)pyrene MCL = 0.002 mg/L; MCGL = 0 mg/L (40 CFR Part 141) CWA: Many PAHs designated Section 307(a)(1) toxic pollutants; Many PAHs designated Section 304(a) priority pollutants with established water quality criteria; NPDES effluent limitations (40 CFR Part 122); general pretreatment standards (40 CFR Part 403)		RCRA: No known requirements	SARA Section 313: Releases reported to TRI by qualifying facilities (40 CFR 372.65) CERCLA Section 103:
Policy and Programs (nonregulatory actions)						

A.3.13 ATRAZINE

Atrazine is a chloro-triazine which is widely used as a herbicide for controlling broadleaf and grassy weeds in corn sorghum, rangeland, sugarcane, macadamia orchards, pineapple, turf grass sod, asparagus, forestry, grasslands, grass crops, and roses. It has been widely used in the agricultural regions of the Great Lakes basin since 1959 and was estimated to be the most heavily used herbicide in the U.S. in 1987 to 89. During that time, atrazine was most extensively used for corn and soybeans in Illinois, Indiana, Iowa, Kansas, Missouri, Nebraska, Ohio, Texas, and Wisconsin.

EPA has promulgated maximum contaminant levels for atrazine under the Safe Drinking Water Act. In addition, 40 CFR 180.220(a) establishes tolerances for combined residues of atrazine in raw agricultural commodities. Atrazine is subject to use, disposal, and management regulations under TSCA and releases must be reported to TRI by qualifying facilities under SARA Section 313. Atrazine is not regulated under the CAA or RCRA.

Table A-17. Management of Atrazine in the Lake Michigan Basin

PAHs						
	Air	Soils / Sediments	Water	Biota	Waste	Reporting Requirements / Spills
<u>Standards and Regulations</u>	Clean Air Act: Not targeted	TSCA: Use, disposal, and management regulations (40 CFR Part 761) FIFRA: Standard tolerances (40 CFR 180.220(b)); labeling requirements	SDWA: MCL = 0.003 mg/L; MCLG = 0.003 mg/L (40 CFR Part 141)	Tolerances established for combined residues of atrazine in raw agricultural commodities (40 CFR 180.220(a))	RCRA: No known requirements	SARA Section 313: Releases reported to TRI by qualifying facilities (40 CFR 372.65) CERCLA Section 103: None
Policy and Programs (nonregulatory actions)						

A.3.14 SELENIUM

Several EPA offices regulate selenium as a pollutant under EPCRA, including the Office of Drinking Water, the Office of Water Regulations and Standards, the Office of Emergency and Remedial Response, the Office of Solid Waste, and the Office of Toxic Substances.

Under RCRA, if selenium (D010) is characterized as a hazardous waste when subjected to the Toxicity Characteristic Leaching Procedure (TCLP) listed in 40 CFR 261.24, it must be managed as a hazardous waste in accordance with state and federal regulations.

Section 8(a) of TSCA requires manufacturers of selenium to report to EPA with preliminary assessment information concerning production, use, and exposure. Owners or operators of qualifying vessels or facilities are required to notify the National Response Center when there is a release of selenium in an amount equal to or greater than its reportable quantity of 100 pounds.

The EPA MCL for selenium in drinking water is 0.05 ppm. The FDA has determined that a level of 0.010 ppm selenium is allowable in bottled water. Permissible exposure limits of selenium are regulated by OSHA. The OSHA exposure limit for selenium compounds in workplace air is 0.2 mg/m³ for an 8-hour day over a 40-hour work week.

[Source: ATSDR website <http://atsdr.cdc.gov/tfacts92>; and TOXNET <http://sis.nlm.nih.gov/sis1/index.html>.]

Table A-18. Management of Selenium in the Lake Michigan Basin

Selenium						
	Air	Soils / Sediments	Water	Biota	Waste	Reporting Requirements / Spills
Standards and Regulations	<p>Clean Air Act: Selenium compounds designated Section 112(b) hazardous air pollutants; NESHAPS / MACT Standards (40 CFR Parts 61 and 63)</p> <p>OSHA: PEL 0.2 mg/m³ for 8-hour day 40- hour work week</p>		<p>SDWA: MCL = 0.05 mg/L; MCLG = 0.05 mg/L (40 CFR Part 141)</p> <p>CWA: Selenium compounds designated Section 307(a)(1) toxic pollutants; Section 304(a) priority pollutant with established water quality criteria; NPDES effluent limitations (40 CFR Part 122); general pretreatment standards (40 CFR Part 403)</p> <p>FDA: 0.01 ppm in bottled water</p>		<p>RCRA: May be characterized as hazardous (40 CFR 261.24)</p>	<p>SARA Section 313: Releases reported to TRI by qualifying facilities for releases > 100 lbs (40 CFR 372.65)</p> <p>CERCLA: Reporting requirements for spills > 100 lbs (42 USC 9601 and 40 CFR 302.4)</p>
Policy and Programs (nonregulatory actions)						